

PATENT ABSTRACTS OF JAPAN

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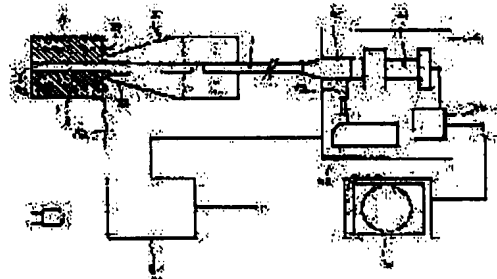
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(54) EARDRUM PROTECTION PLUG INSERTION DEVICE FOR EAR HOLE MAKE-UP

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an eardrum protection plug by fitting removably the eardrum protection plug to a tip of an in-ear fiber scope so as to insert the eardrum protection plug while observing a state in the ear hole and the insert state.

SOLUTION: The eardrum protection plug A with string has a throughhole Ab to be fitted to a protect plug mount 2 at a tip of the in-ear fiber scope 1. The protect plug mount 2 has a flexible guard plug receptacle 21 made of a silicon rubber or the like, whose length is equal or nearly equal to the length of the eardrum protection plug A from the tip of the fiber scope 1. The receptacle 21 has a short cylindrical base 22 extended backward and the short cylindrical base 22 is fitted to proper positions of the in-ear fiber scope 1. Then the eardrum protection plug A is fitted to the protect plug mount 2 at the tip of the fiber scope 1 by a middle throughhole Ab and pressed into contact with the guard shaped flexible receptacle 21.



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CLAIMS

[Claim(s)]

[Claim 1] An eardrum protection plug insertion device for ear medium size picking forming a protection plug fitting part which makes an eardrum protection plug for ear medium size picking fit into a tip part of fiberscope in an ear, enabling free attachment and detachment.

[Claim 2] An eardrum protection plug insertion device for ear medium size picking characterized by forming a protection plug fitting part by making a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment, and providing a plug receptacle.

[Claim 3] making a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment — a collar — an eardrum protection plug insertion device for ear medium size picking characterized by forming a protection plug fitting part by providing a flexible plug receptacle of **.

[Claim 4] making a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment — a collar — by providing a flexible plug receptacle of **. An eardrum protection plug insertion device for ear medium size picking characterized by ***** which forms a protection plug fitting part and provides a grip behind this protection plug fitting part.

[Claim 5] making a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment — a collar — by providing a flexible plug receptacle of **. An eardrum protection plug insertion device for ear medium size picking having formed a protection plug fitting part, and having provided a grip behind this protection plug fitting part, and making an end place of fiberscope in the ear equip with an electric image means and a light projection means.

[Claim 6] The eardrum protection plug insertion device for ear medium size picking according to claim 1 or 2 which provides a mechanical **** lump means of this fiberscope in an ear to a proper place of fiberscope in an ear.

[Claim 7] As a mechanical **** lump means, march in behind a protection plug fitting part of fiberscope in an ear, and a unit is provided, The eardrum protection plug insertion device for ear medium size picking according to claim 6 which equips with an electrode holder which equips the front end of this **** lump unit with a funnel-like protection plug insertion guide, enabling free attachment and detachment, and is made to contact this funnel-like protection plug insertion guide to surrounding temporal region of an ear enabling free attachment and detachment.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the eardrum protection plug insertion device for ear medium size picking.

[0002]

[Description of the Prior Art] Hearing aid and the hearing aid in an ear which is miniaturized remarkably and inserted in an earhole these days are developed with the miniaturization of a semiconductor part etc. The hearing aid in this ear is an earplug-like thing.

Although the hearing aid circuit which comprises several kinds of necessary electronic parts is built in, in order to use it, inserting into an earhole for a long time, it is necessary to make the shape of user everybody's earhole suit, and, under the present circumstances, is manufactured in the following procedure.

(1) Mold an earhole.

** Clean by checking that there is no trouble, such as a crack, into an earhole.

** Stop less than 10 mm a closet and before the eardrum deeply in an earhole, the point floodlighting the flexible eardrum protection plug (refer to drawing 4) about 10 mm in diameter, and about 10 mm in length which comprises the cylindrical sponge which attached thread for drawers to tapered shape with the aedeagus implement with a light (a thing like a penlight) which became thin. Although the depth to the eardrum has individual difference, it is usually about 27-32 mm.

** Knead each optimum dose of the principal member of a filler, and hardening material, put into transfer pipet, and pour in into an earhole. With construction material, a ratio, etc., although this injecting material is not uniform, it is usually solidified in about 5 minutes.

** Take out the solidified injecting material from an earhole, lengthen thread and also take out an eardrum protection plug. In this way, the taken-out solidification injecting material molds the shape in an earhole, and serves as a master for synthetic resin shaping.

(2) Manufacture the hearing aid in an ear based on the molded master.

** Make a female die from a synthetic resin using the molded master.

** Make a synthetic resin layer form in the inner surface of the female die, and make a coat.

** Incorporate the hearing aid circuit which comprises several kinds of necessary electronic parts in the coat, pour in and harden a synthetic resin, and make the whole unify.

** Remove what was made in this way from the female die, and it becomes a finished product.

[0003]

[Problem(s) to be Solved by the Invention] However, if an eardrum protection plug is inserted as mentioned above when molding an earhole, Since it is hard to grasp the insertion situation and the situation inside an eardrum protection plug cannot be viewed in particular, it will depend on the intuition of the medical practitioner etc. who insert much, and is hard to secure a proper insertion point and an insertion attitude, and the insertion is not easy. On the other hand, the hearing aid in an ear occasionally expected cannot be obtained with [for a person to be inserted] pain occasionally. Then, by using fiberscope in the fixed state, as this invention can

insert an eardrum protection plug, observing the situation and insertion situation in an earhole, it tends to solve those problems.

[0004]

[Means for Solving the Problem]An invention of claim 1 formed a protection plug fitting part which makes an eardrum protection plug for ear medium size picking fit into a tip part of fiberscope in an ear, enabling free attachment and detachment for the above-mentioned purpose achievement. An invention of claim 2 is making a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment, and providing a plug receptacle, and formed a protection plug fitting part.an invention of claim 3 makes a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment — a collar — it is providing a flexible plug receptacle of **, and a protection plug fitting part was formed

[0005]an invention of claim 4 makes a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment — a collar — it is providing a flexible plug receptacle of **, and a protection plug fitting part is formed and it is characterized by ***** which provides a grip behind this protection plug fitting part. an invention of claim 5 makes a tip part of fiberscope in an ear hold a part for ** length an eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment — a collar — it being providing a flexible plug receptacle of **, and, A protection plug fitting part was formed, and a grip was provided behind this protection plug fitting part, and an end piece of fiberscope in the ear was made to equip with an electric image means and a light projection means.

[0006]An invention of claim 6 provides a mechanical ***** lump means of this fiberscope in an ear to a proper place of fiberscope in an ear in an invention of above-mentioned claim 1 or claim 2. In an invention of above-mentioned claim 6, an invention of claim 7 as a mechanical ***** lump means, It equips with an electrode holder which marches in behind a protection plug fitting part of fiberscope in an ear, provides a unit, and equips the front end of this ***** lump unit with a funnel-like protection plug insertion guide, enabling free attachment and detachment, and is made to contact this funnel-like protection plug insertion guide to surrounding temporal region of an ear, enabling free attachment and detachment.

[0007]

[Embodiment of the Invention]

The 1. drawing 1 thru/or drawing 4 shows the embodiment concerning claim 1 thru/or claim 5. In drawing 1 thru/or drawing 4, the protection plug fitting part which the fiberscope in an ear with thin eardrum protection plug with thread which A inserts into an earhole and 1, and 2 formed in the tip part of this fiberscope in an ear, and 3 are the grips provided behind this protection plug fitting part. The television camera with a light projection means which 4 put in a row at the end of the fiberscope in the ear, and 5 are liquid crystal display monitors which make a picture the video signal from this television camera, and constitute the electric image means by these. 6 is an external power unit for these.

[0008]As the eardrum protection plug A with thread is the same as the conventional thing and it is shown in drawing 4, It is a flexible thing about 10 mm in diameter, and about 10 mm in length which comprises the cylindrical sponge which attached the thread Aa for drawers, and has the bore Ab which makes the tip part slack protection plug fitting part 2 of the fiberscope 1 in an ear fit in in the center.

[0009]The fiberscope 1 in an ear performs the exterior to glass fiber, and the existing thing which made the outer diameter the inside and outside of 2.4 mm may be sufficient as it, and it may set aside what shares an imaging system and a floodlighting system about inner glass fiber.The protection plug fitting part 2 of the tip part of the fiberscope 1 in an ear, Length equivalent to the length of the eardrum protection plug A thru/or almost equivalent is made to hold from the tip of the fiberscope in an ear, as shown in drawing 1 and drawing 2, the collar by silicone rubber etc. — the flexible plug receptacle 21 of ** is arranged, the short tubed base 22 which carries out extension is established in back, and the proper place of the fiberscope 1 in an

ear is made to do fit fixing of this tubed base to this plug receptacle As shown in drawing 1 and drawing 2, the grip 3 of the protection plug fitting part 2 in back, Form in the pen form of proper length and thickness which is easy to have with a synthetic resin and is easy to treat, narrow a tip part to tapered shape, and make the periphery of the tubed base 22 of the above-mentioned plug receptacle 21 fit in the tip, and inside, Crease prevention of the fiberscope 1 in an ear which is made to insert the fiberscope 1 in an ear in the longitudinal direction, equipped the back end with the soft bush 31 by silicone rubber etc., and was made to insert in it is aimed at. When not using the grip 3, it is good to press down the periphery of the tubed base 22 of the above-mentioned plug receptacle 21 with heat-shrinkable tubing.

[0010]As shown in drawing 1 and drawing 3, the television camera 4 with a light projection means, The main part 41 of a CCD camera and the floodlight 42 are put in a row at the end of the fiberscope 1 in an ear via the optical system connector 43, and he electrically connects the driver 44 for cameras to the above-mentioned main part 41 of a CCD camera, and is trying to obtain a video signal from this driver for cameras. More particularly, the television camera 4 with a light projection means, As shown in drawing 3, have the pin jack 45 which sends the video signal outputs from the driver 44 for cameras to the liquid crystal display monitor 5, and as a power system, While making the battery 46 build in enabling free attachment and detachment, forming the internal power supply circuit which has the power fuse 47, and constituting from this internal power supply circuit so that necessary AC voltage may be impressed to each part via the electric power switch 48 made to arrange in a proper place, He prepares a proper place the power supply jack 49 connected with the internal power supply circuit, and is trying to connect with the outgoing end of the external power unit 6 via the power cord 61.

[0011]Although the existing thing may be sufficient as the liquid crystal display monitor 5, a CRT monitor may be sufficient as it and the television receiver generally marketed may be sufficient as it. What is necessary is in short, just to be able to reproduce in a picture the video output signals acquired from the driver for cameras of the television camera 4 with a light projection means. The AC adapter which connects with commercial AC power, obtains the DC output of prescribed voltage from the AC, and is generally used conventionally may be sufficient as the external power unit 6. The DC output of this external power unit 6 is supplied to the television camera 4 and the liquid crystal display monitor 5 with a light projection means, and acquires these necessary operations.

[0012]It is the composition on ** and is used in the following procedure.

** Use the external power unit 6, make one the electric power switch 48 of the television camera 4 with a light projection means, and the electric power switch (not shown) of the liquid crystal display monitor 5, and make all into an attitude of operation. What is necessary is to remove this power cord 61 and to use only the built-in battery 46, if it seems that the power cord 61 becomes obstructive at the handling of the television camera 4 with a light projection means. In this attitude of operation, the television camera 4 with a light projection means sends the light from the floodlight 42 to the fiberscope 1 in an ear via the optical system connector 43, is made to floodlight it from the tip of this fiberscope in an ear to the front, and illuminates that front. The television camera 4 with a light projection means, The catoptric light (image) from the photographic subject which won popularity by the fiberscope 1 in an ear is picturized by the main part 41 of a CCD camera through the optical system connector 43, it changes into the electrical signal for every pixel, this is made into a series of video signals with the driver 44 for cameras, and this is sent to the liquid crystal display monitor 5. The liquid crystal display monitor 5 which received the video signal makes the video signal a picture.

** making the eardrum protection plug A fit into the protection plug fitting part 2 of the tip part of the fiberscope 1 in an ear by the bore Ab of the center — a collar — make the flexible plug receptacle 21 of ** contact Under the present circumstances, the thread Aa of that eardrum protection plug A is hung down below.

** Grasp the grip 3 and insert the eardrum protection plug A into an earhole. Under the present circumstances, it is made to advance, observing that insertion situation with the liquid crystal display monitor 5, and stops in the position of the inside and outside of this side 10mm of the eardrum. The thread Aa of the eardrum protection plug A is hung down out of an earhole. The

inserted eardrum protection plug A is compressed within a narrow earhole, is welded by pressure to the wall of an earhole by the stability of the very thing, and holds the position.

**** Draw out the fiberscope 1 in the ear. The protection plug fitting part 2 of the fiberscope 1 in an ear escapes from the bore Ab of the eardrum protection plug A by this drawing, and this bore is automatically closed based on compression of the eardrum protection plug within an earhole.**

**** Each optimum dose of the principal member of a filler and hardening material is kneaded, put into transfer pipet, pour in into an earhole, and make it solidify.**

**** Although the solidified injecting material serves as a master for synthetic resin shaping, take this out from an earhole, and it ranks second, lengthens the thread Aa, and pulls out the eardrum protection plug A. If the inside of an earhole negative-pressure-izes in connection with the drawer of this eardrum protection plug A, the open air will flow from the central bore Ab.**

[0013]Henceforth, the hearing aid in an ear should just be produced using the master as before. The finder which has a magnifying lens system is provided and it may enable it to peep in the end piece of the fiberscope 1 in an ear. What is necessary is just to carry out finger control of the fiberscope 1 in an ear soon in what does not use the grip 3.

[0014]The 2. drawing 5 thru/or drawing 8 shows the embodiment concerning claim 6 thru/or claim 7. In drawing 5 thru/or drawing 8, the fiberscope in an ear with thin eardrum protection plug with thread which A inserts into an earhole and 1, and 2 are the protection plug fitting parts formed in the tip part of this fiberscope in an ear. The television camera with a light projection means which 4 put in a row at the end of the fiberscope in the ear, and 5 are liquid crystal display monitors which make a picture the video signal from this television camera, and constitute the electric image means by these. 6 is an external power unit for these. About the above each part, it is the same as the thing of the above-mentioned 1., and explanation is omitted with the contents of the 1.

[0015]7 is the mechanical ******** lump means with which the tip part of the above-mentioned fiberscope 1 in an ear was made to equip. Round this mechanical ******** lump means 7 behind the protection plug fitting part 2 of the fiberscope in an ear, and the unit 71 is formed. It equips with the electrode holder 73 which equips the front end of this ******** lump unit with the funnel-like protection plug insertion guide 72, enabling free attachment and detachment, and is made to contact this funnel-like protection plug insertion guide to the surrounding temporal region of an ear, enabling free attachment and detachment.

[0016]Cylinder body 711 which served as the grip in which march in and the unit 71 makes the penetration loose insertion of the fiberscope 1 in an ear carry out in the direction of a pipe. The inner package of the slider 712 which slides in the direction of a pipe inside is carried out. Fix the proper place of the fiberscope 1 in the ear to this slider, it is made to make it follow, and the rack 713 of the direction of a pipe is formed in the undersurface of this slider, and it is the cylinder body 711. The pinion 714 which gears with the rack is allotted to an inner proper place. While carrying out the bearing of this pinion and the pinion shaft 715 rotated to one to the cylinder body 711. Make the end of this pinion shaft project out of a cylinder body, pinch to this projecting end, and 716 is attached. He sends the rack 713 to the front or back, and is trying to make the fiberscope 1 in an ear go in and out with the slider 712 interlocked with this by rotating the pinion 714 by rotation of this knob. The slider 712 is binding tight the fiberscope 1 in an ear which it let pass to the insertion hole by putting in a rate on this insertion hole and carrying out thread fastening of between the right and left while forming in the central part the insertion hole which lets the fiberscope 1 in an ear pass. The guide rail 717 is formed in the slider 712 at both sides, and it is the cylinder body 711 about this guide rail. Although it is made to fit into the guidance projected rim 718 provided in inner both sides slidably and not being illustrated, the moving range is regulated by the stopper. The stop boss 719 of an up-and-down couple is protruded on the front end part inner surface of the cylinder body 711. The rack 713 which gets into gear mutually [********], and the pinion 714 may be the file plates and rollers which carry out friction engagement mutually.

[0017]The funnel-like protection plug insertion guide 72 rounds the periphery of the rear end part 721, fit it to the front end part inner circumference of the cylinder body 711 of the unit 71, and it is formed in a cylinder. The L character-like engagement groove 722 of the couple which

engages with the stop boss 719 of the cylinder body 711 is formed in this rear end part 721, While forming the front end part 723 in a loose taper, and fitting the inner circumference of the thinnest front end to the periphery of the eardrum protection plug A, rounding the rear end part 721 and making it fit into the front end part of the cylinder body 711 of the unit 71, The L character-like engagement groove 722 is made to engage with the stop boss 719, and is made to connect enabling free attachment and detachment. **, march in with the length of the funnel-like protection plug insertion guide 72, and a relation with the delivery distance of the fiberscope 1 in an ear by the unit 71, The fiberscope 1 in an ear marches in, and the protection plug fitting part 2 is located inside the front end part 723, and enables it to march in even to the position in an earhole a termination. For example, a 17-mm inside-and-outside delivery is carried out from the state where it retreated 3-5 mm from the tip of the funnel-like protection plug insertion guide 72. The outward flange 724 made to contact the cheek of an earhole is formed in the nearly tip at the funnel-like protection plug insertion guide 72.

[0018]The holder body 731 of a bowl form which puts the electrode holder 73 on an ear and is made to contact to the temporal region is formed, The fitting tube 732 which enables penetration fitting of the attachment and detachment of the funnel-like protection plug insertion guide 72 is formed in the pars intermedia of this holder body, The cushioning material 734 which carries out penetration screwing of the lock screw 733 to the funnel-like protection plug insertion guide 72 at this fitting tube, and is made to contact the periphery of the holder body 731 to the temporal region is attached.

[0019]Since it is the composition on **, round the protection plug fitting part 2 of the fiberscope 1 in an ear, and it is made to retreat to a termination first in use, The electrode holder 73 is rounded from the funnel-like protection plug insertion guide 72 again, the funnel-like protection plug insertion guide 72 is once demounted from the unit 71, respectively, the eardrum protection plug A is inserted in the protection plug fitting part 2 as mentioned above, and the funnel-like protection plug insertion guide 72 is attached again. And while putting the electrode holder 73 on an ear, making it contact to the temporal region and making the front end part 723 of the funnel-like protection plug insertion guide 72 fit in the fitting tube 732 of the electrode holder 73, A tip is inserted in an earhole until the outward flange 724 runs against the cheek of an earhole, and the lock screw 733 of the electrode holder 73 is bound tight. Next, it marches in, the knob 716 of the unit 71 is rotated, and it lets out the fiberscope 1 in an ear, and the eardrum protection plug A is inserted even in the prescribed position in an earhole like the case of the above-mentioned 1., observing the insertion situation with the liquid crystal display monitor 5. What is necessary is to leave the eardrum protection plug A after that, and also just to trip all device relations. About other operations and operation, since it is the same as the contents described in the procedure of the above-mentioned 1., it omits with the explanation.

[0020]

[Effect of the Invention]According to the invention of claim 1, claim 2, claim 3, claim 4, claim 5, claim 6, and claim 7. Observing the situation and insertion situation in an earhole by fiberscope, since it is previous statement composition. And an eardrum protection plug can be inserted in an insertion instrument exactly and safely by an insertion attitude proper to a proper insertion point using this fiberscope, an ear type can be taken correctly, without giving a person to be inserted pain, and the proper hearing aid in an ear expected can be provided. By according to the invention of claim 2, claim 3, claim 4, and claim 5, making the tip part of the fiberscope in an ear hold a part for the ** length the eardrum protection plug for ear medium size picking is made to fit into from a tip, enabling free attachment and detachment, and providing a plug receptacle. Since the protection plug fitting part is formed, this protection plug fitting part can be made to support an eardrum protection plug stably and certainly, and unnatural modification is not given to the inserted eardrum protection plug. according to the invention of claim 3, claim 4, and claim 5 — the plug receptacle of the protection plug fitting part — a collar — since it is considered as the flexible thing of **, the wall of an earhole is not damaged. Since the grip is provided behind the protection plug fitting part of the fiberscope in an ear according to the invention of claim 4 and claim 5, inserting operation can carry out by the ability to carry out easily and exactly. Since the end piece of the fiberscope in an ear is made to equip with an electric image means and a

light projection means according to the invention of claim 5, the picture in the earhole fully expanded by monitor can be observed, and it is convenient convenience very much. Since the mechanical **** lump means of this fiberscope in an ear is provided to the proper place of the fiberscope in an ear according to the invention of claim 6 and claim 7, safe moreover, an eardrum protection plug can be inserted certainly easily mechanically stably. According to the invention of claim 7, as a mechanical **** lump means, march in behind the protection plug fitting part of the fiberscope in an ear, and a unit is provided, Since it has equipped with the electrode holder which equips the front end of this **** lump unit with a funnel-like protection plug insertion guide, enabling free attachment and detachment, and is made to contact this funnel-like protection plug insertion guide to the surrounding temporal region of an ear, enabling free attachment and detachment, the mechanical **** lump means can be embodied briefly, and it can manufacture by low cost, and can provide cheaply.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a composition point explanatory view showing the embodiment concerning the invention of claim 1 thru/or claim 5.

[Drawing 2] It is the protection plug fitting part of the fiberscope in an ear and the vertical section side view of a grip which the embodiment can set.

[Drawing 3] It is a composition point explanatory view of the television camera with a floodlight which the embodiment can set.

[Drawing 4] It is a perspective view showing the eardrum protection plug with thread inserted into an earhole.

[Drawing 5] It is a vertical section side view of an important section showing the embodiment concerning the invention of claim 6 and claim 7.

[Drawing 6] It is a crossing top view of the important section of the embodiment.

[Drawing 7] It is a vertical section front view of the important section of the embodiment.

[Description of Notations]

A — Eardrum protection plug Aa with thread — Thread

Ab — Bore

1 — Fiberscope in an ear

2 — Protection plug fitting part 21 — Plug receptacle

22 — Tubed base

3 — Grip 31 — Bush

4 — Television camera with a light projection means

41 — Main part of CCD camera 42 — Floodlight

43 — Optical system connector 44 — Driver for cameras

45 — Pin jack 46 — Battery

47 — Power fuse 48 — Electric power switch

49 — Power supply jack

5 — Liquid crystal display monitor

6 — External power unit 61 — Power cord

7 — Mechanical *** lump means 71 — It marches in and is a unit.

711 — Cylinder body 712 — Slider

713 — Rack 714 — Pinion

715 — Pinion shaft 716 — Knob

717 — Guide rail 718 — Guidance projected rim

719 — Stop boss

72 — Funnel-like protection plug insertion guide 721 — Rear end part

722 — L character-like engagement groove 723 — Front end part

724 — Outward flange

73 — Electrode-holder 731 — Holder body

732 — Fitting tube 733 — Lockscrew

734 — Cushioning material

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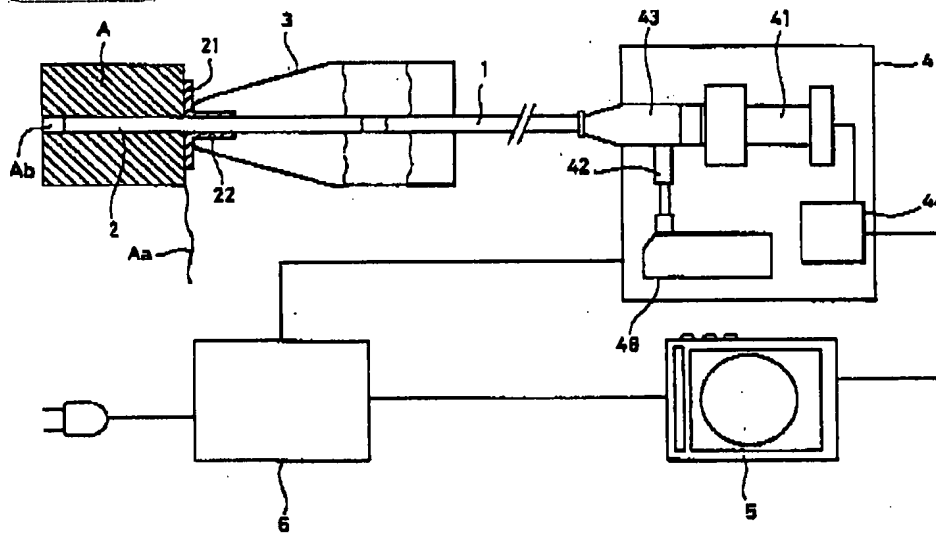
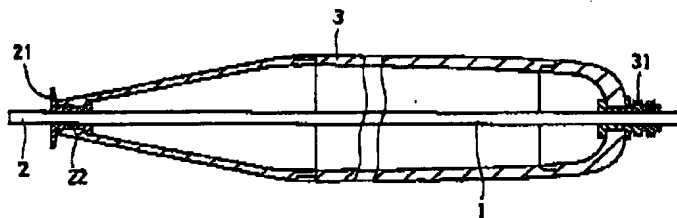
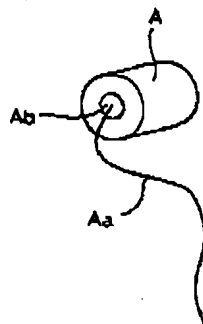
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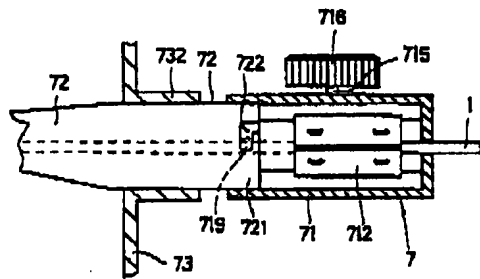
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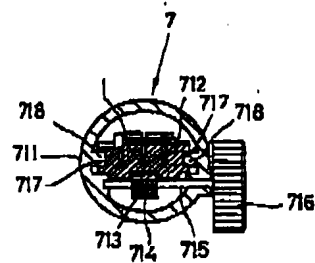
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DRAWINGS

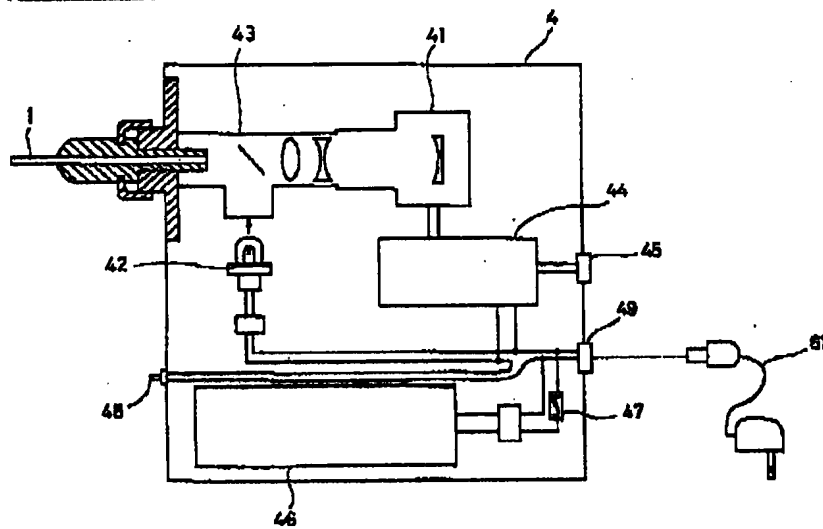
[Drawing 1]**[Drawing 2]****[Drawing 4]****[Drawing 6]**



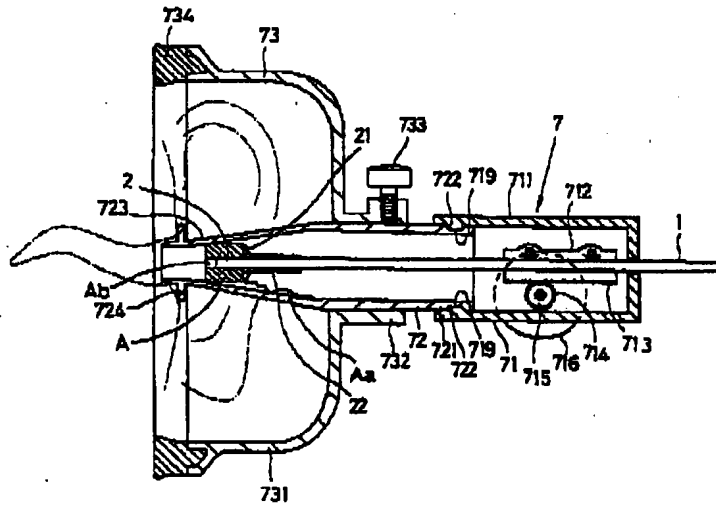
[Drawing 7]



[Drawing 3]



[Drawing 5]



[Translation done.]